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ABSTRACT

Undergraduates who were anticipating a one semester course final were used as subjects in this investigation of the relationship between pretest anxiety and the amount of preparation for the test. In addition, the authors examined the relationship between anxiety and performance and between quantity of preparation and performance. Both trait and state anxiety were measured during data collection. Findings reveal that: (1) anxiety associated with the examination was significantly positively related to out-of-class preparation; (2) quantity of study had a near zero relationship with performance on the examination; and (3) there is a negative relationship between state anxiety during the test preparation period and actual performance on the test. The authors conclude, with qualifications, that examinations geared toward stimulating out-of-class preparation could be omitted. It is suggested that educators reexamine their rationales for testing students. (TL)

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EFFECTS OF ANXIETY ON QUANTITY OF EXAMINATION PREPARATION

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The American educational system assumes that students spend time outside the classroom learning course material. The importance of this student behavior in the educational process is attested to by the fact that teachers frequently cite poor homework performance or a lack of examination preparation as a primary cause of student failure. In this connection Holtzman and Brown (1968) found that study habits, as reported on the Study Habits and Attitudes Scale (Brown and Holtzman, 1953) correlated .49 with grade point average in high school.

Despite its apparent importance there has been very little research into the variables affecting out-of-class preparation. Martin (1970) investigated the relationship between anxiety associated with an upcoming examination and study for that examination. Using advanced graduate students preparing for doctoral qualifying examinations, he found that the total amount of study during the last two weeks prior to the examination correlated -.55 with the mean anxiety level during that period.

The generalizability of the above finding to the typical classroom situation is limited due to: 1. The unique characteristics of the students studied (advanced graduate students), 2. the unusual length of the preparation interval, 3. the

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unusually high level of anxiety associated with this examination, and 4. the necessarily small sample involved. The purpose of the study was to investigate the relationship between anxiety manifest during the period of preparation for an examination and study for that examination using undergraduate students who were anticipating a one semester course final examination.

Subjects:

One hundred female, undergraduate, elementary education majors at the University of Texas at Austin served as subjects. They were all enrolled in a one semester mathematics course which had a reputation among the students as being academically demanding. This situation was chosen in order to insure that the final course examination would be at least moderately stressful.

Procedure:

After a brief explanation of the study, the subjects were administered the Trait Anxiety Inventory (Spielberger, Gorsuch, and Lushene, 1969) and a short form of the State Anxiety Inventory (O'Neil and Hansen, 1969), in that order. For the Trait Anxiety Inventory Ss were asked to indicate their general level of anxiety, and on the State Anxiety Inventory, Ss were asked to indicate the amount of anxiety they felt that day about their upcoming final examination. Ss were then asked to take home a booklet containing four short-form State Anxiety Inventories and report the anxiety they felt at the end of each day about the upcoming examination. After completing each anxiety questionaire, they recorded the amount of time spent studying for the examination that day. These

forms were subsequently collected on the day of the examination. Cooperation was encouraged by offering five additional points on the examination if the forms were completed and returned on the day of the test.

Results:

Since Ss were drawn from classes taught by two different instructors, a groups (two instructors) by trials (each of the five days prior to the examination considered a trial) analysis of variance was performed to check for significant differences between instructors across trials for anxiety and study. A significant main effect for instructors was found for anxiety, so the results are reported separately for each instructor.

Table I presents the mean anxiety levels for both groups for subjects on each of the five days prior to the examination.

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Insert Table I

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One of the concerns in designing this study was to find a situation which produced substantial anxiety. Spielberger, Gorsuch, and Lushene, (1969), provide norms for each item of the State Anxiety Inventory. By comparing the scores in TableI to the norms for the items used in this study, a rough assessment of the stress of the present situation can be made. Spielberger et al, report that undergraduates, under "normal"conditions, obtain a mean state anxiety level of 8.45 on the items making up the short form. Table I reveals that group B reported mean anxiety levels higher than this level all five days before the

examination and group A for the last two days prior to the examination. Further, a repeated measures analysis of variance revealed that the mean anxiety levels for both groups increased significantly, (in a positively accelerating fashion), over the preparation period. Taken together, these results support the contention that the situation was stressful.

Table II presents the mean preparation time, in hours, for both groups of subjects for each of the five days prior to the examination.

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Insert Table II

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Table II reveals that little study was reported by either group until two days before the examination, and the majority of the preparation for the examination took place on the last day. A repeated measures analysis of variance revealed that preparation increased significantly over the preparation interval as was the case for anxiety.

The primary purpose of this investigation was to determine the relationship between anxiety manifest during the preparation interval and time spent in preparation, between anxiety and performance, and between quantity of preparation and performance. Table III presents these correlations for both groups of students.

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Insert Table III

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Table III reveals that the mean state anxiety manifest during the preparation interval correlated .46 (group A) and .58 (group B) with the total amount of study during the preparation interval. Both correlations were significant at the .01 level. Mean state anxiety in this table refers to the general level of state anxiety reported during the five days prior to the examination, and this measure was obtained by summing the five state anxiety scores and dividing by five. Trait anxiety was found to correlate less well with quantity of study (.30, group A and .19 group B), and only the correlation for group A was significantly different from zero (p .05). The correlations between study and performance were not significant, being -.02 for group A and -.20 for group B. The correlations between mean state anxiety and performance were moderately strong in a negative direction, (-.23,group A, and -.32, group B), although only the correlation for group B was significant. The correlations between trait anxiety and performance were -.17 (group A), and -.07 (gourp B) neither of which were significant.

Discussion:

One of the major findings of this study was that anxiety associated with an examination, and manifest during the period of preparation for that examination, was significantly positively related to out-of-class preparation for that examination. This significant positive correlation is in direct opposition to the significant negative correlation of the same magnitude found in the earlier study by Martin (1970). Although this difference is difficult to explain, it seems possible that the difference

lies in the extremely high levels of anxiety associated with the doctoral level examination. In this regard it could be hypothesized that as anxiety increases from a very low level to a moderate level (as was the case for this study) quantity of preparation increases; but as anxiety increases from a moderately to an extremely high level, (as was the case for the earlier study), preparation decreases. This pattern is, of course, similar to that which Malmo (1966) has hypothesized with regard to activation and task performance.

This study also found that quantity of study had a near zero relationship with performance on the examination, while the earlier study found a significant positive correlation between these two variables. This inconsistency may be explained by the fact that in the qualifying examination situation each student engaged in weeks of preparation, while in the present situation only a few hours of study were involved. In the latter case it is difficult to imagine how such small differences in quantities of preparation could have had a significant effect on the outcome of the examination.

Consistent with the earlier study was the finding in this investigation of a negative relationship between state anxiety manifest during the preparation period and performance on the examination. This relationship could be explained in several ways. Two possible explanations are that: 1. anxiety during the preparation period related positively to anxiety manifest at the time of the examination, which was in turn related negatively to performance (the latter relationship has been repeatedly documented), or 2. anxiety during the preparation period decreased the quality of study (despite increasing the quantity) which in

turn reduced performance. The former explanation seems most likely. In further research in this area, anxiety at the time of the examination should be assessed so that the variance attributable to it could be partialed from the correlation between preparation anxiety and performance.

Trait anxiety was less strongly related to performance than was state anxiety, while still being in the expected negative direction. Also, trait anxiety was less strongly related to out-of-class preparation than was state anxiety. This pattern was also found in the earlier study by Martin. This result provides support for Spielbergers State-Trait theory of anxiety which posits that anxiety specific to a given situation will be more strongly related to behavior in that situation, than will the general predisposition to be anxious.

The implications of this study for general educational practice are clear. If the primary reason for giving semester examinations is to stimulate out-of-class preparation, then the examination could be omitted from the instructional program with no loss in knowledge acquisition. Deletion of such examinations would have the positive effects of alleviating significant student discomforts and reducing instructional cost in terms of teacher time and effort.

This argument does not lead to the conclusion that examinations can not be used to induce significant out-of-class preparation. The results for doctoral students reported above indicate that if the cost of failure is high and/or the probability of failure is high, high rates of preparation are produced. High rates can also be produced by scheduling frequent examinations (Mawhinney, et al., 1971). These findings do indicate that the educator should carefully reexamine his rationale for testing, and adjust his testing schedule accordingly.

TABLE I

MEANS AND STANDARD DEVIATIONS OF ANXIETY SCORES
FOR EACH DAY PRIOR TO THE EXAMINATION

Subjects	5 days before exam	4 days	3 days	2 days	1 day	Mean anxiety sco
Group A (N=53)						
Mean	6.47	6.30	7.08	8.94	11.66	8.09
S. D.	3.48	3.17	3.82	4.64	5.58	3.65
Group B (N=47)						
Mean	8.49	8.74	9.98	10.34	12.47	9.62
S. D.	4.96	4.84	5.77	5.36	6.56	5.21

TABLE II

MEANS AND STANDARD DEVIATIONS OF PREPARATION TIME IN HOURS
FOR EACH DAY PRIOR TO THE EXAMINATION

Subjects	5 days before exam	4 days	3 days	2 days	1 day	Total Study
Group A (N=53)						
Mean (hrs)	.11	.25	.57	1.70	4.64	7.06
S. D.	.50	.58	.96	2.35	2.60	4.43
Group B (N=47)						
Mean (hrs)	.23	.60	1.00	1.72	4.40	7.47
S. D.	.63	1.27	1.74	1.78	3.11	5.62

TABLE III

CORRELATIONS BETWEEN MEAN STATE ANXIETY, TRAIT ANXIETY STUDY, AND EXAMINATION PERFORMANCE

Performance	Mean State Anxiety		Trait Anxiety		Study	
Performance						
Group A	-.23	ns	-.17	ns	-.02	ns
Group B	-.32	(.05)	-.07	ns	-.20	ns
Mean State Anxiety						
Group A			.38	(.01)	.46	(.01)
Group B			.17	ns	.58	(.01)
Trait Anxiety						
Group A					.30	(.05)
Group B					.19	ns
Study						
Group A						
Group B						

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